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Barriers to the Effective Use of Technology in Higher Education

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ABSTRACT:
The aim of this study was to investigate factors acting as barriers that either hinder or contribute to teachers' technology use in the higher level education. Population was consisted of various universities' teachers. The sample size was consisted on 100 participants. The data were collected through survey and web based questionnaire from faculty members of public and private universities of Islamabad. Analyzed and interpreted by using mean, multiple regressions, and Cohen's d to indicate the standardized difference through the use of SPSS. From the data collected, patterns and associations based on the results identified six major barriers to teachers using technology based on the teachers' responses. They are (a) limitations of physical settings i.e. electricity shortfall, (b) availability of materials, (c) conditions of equipment and maintenance, (d) lack of training and interest, (e) low socio-economic status and (f) crowded classrooms and lack of motivation to change long-standing pedagogical practices.

KEY WORDS: Technology adoption, Technology use, Technology barriers, Higher education

INTRODUCTION:

It is argued that, under exact conditions, where teachers are comfortable and skilled in applying educational technology, where adequate resources are available, and where time and work load allows teachers and students to use it, technology is "clearly suitable a exclusive and well-functioning instructional tool" [1]. Likewise, studies revealed that teachers think that technology offers unique settlement in instructional process [2]. However, studies also bring into being that technology assimilation has not been achieved, in significance that the faculty employ technology for partial tasks [3] For example, [4] found that most of university teachers mainly used computer technology for organizational tasks. Cuban also found that teachers used technology for communicative purposes like sending emails to parents, correspondence with students. Likewise,[5] discovered that the majority of the faculty used computers to do organizational responsibilities and not as a basic part of the student learning process. Global researches also discovered similar results. In Australia, for instance, [6] revealed that in spite of simple and adequate access towards the technology, a majority of novice teachers did not use the accessible resources for instructional point of view.

The use of education technology and information and communication technology all promote for learning by using technology. [7] describes e-learning; learning technology; online learning; blended learning; invasive learning and mobile learning as the multi dimensions of learning technology each with their own structural reforms. The mediums of education recognized are computer-based; video conferencing; satellite, webcast and CD-ROM. These types of learning are on the increase as education institutions want to generate high caliber students who are compatible with the globalized order .[8] thought that education technology can enhance teaching and, learning if the focus is on educational objectives and technology can be used as a possibility. The study will give a thoughtful understanding in term of effective technological usage in education and how it impacts on teaching and learning by highlighting its strengths and the challenges which obstruct a meaningful education experience for both teacher and learner. The research will therefore observe how technology molds the upcoming of education with the eradication of major barriers.

Why instructional technologies are not being used by the teachers with a comfortable mode? Several factors affect teachers' technology usage. Initially, numerous studies identified lack of availability and access as one of the major barrier not allowed the teachers from using technology [9]. According to this analysis, for faculty to effective use of technology, the foremost thing is the availability and accessibility of resources to them. However, this stipulation seems to be getting satisfied now as technologies have entered the classrooms. Lack of accessibility of resources and access to technology is no longer considered to be a major barrier to teachers' technology implementation [10]. It is also significant to point out that this barrier may still subsist in underdeveloped or developing countries where monetary resources to bring technology into educational institutions are limited.

Many authors pointed the lack of technology addition to teacher education [11]. [12] Recommended that teacher education programs should organize pre-service teachers

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in terms of technology that can persuade their future teaching requirements. However, teachers have limited expertise and self-confidence in using the hardware and software provided for their age group [13] Based on a global survey among national samples of universities from 26 countries,[14] identified the major obstacles that impede teachers' technology use in universities. He found that two of the biggest obstacles to teachers' technology use were teachers' lack of knowledge and skills, and not enough training opportunities for teachers. He concluded that "educational innovations usually do not succeed if the teachers are not provided with the skills and knowledge required to transmit them out".

LITERATURE REVIEW

Education technology is the combination of practice which helps the learning in order to create, manage and use technology to perk up teaching and learning AECT. Education technology (e-technology) and learning technology has become an imperative aspect in skills development globally. In such, education based technology has a number of barriers for all stakeholders concerned, once overcome technology will be have greater collision in the curriculum as opposed to only being having a subject matter on its own, without obvious educational objectives and with student having access to it all the time.

The barriers of education technology can be split into categories. The student barriers include more self-discipline needed by students, abridged contact with educator and peers; special needs by students and printing costs [15]. The system is towards academic input, learning support accessibility, cultural implications impact on the attendance of learners, an information excess due to the internet, plagiarism and security threats are on the increase and not all courses can be taught via e-learning such as Humanities and Arts. Park, [16] thought that teachers would like to have more time to prepare their course, have technology sustain and guarantee better important and guiding with the use of technology, as well as have opinion based on their work. They emphasize the use of positive feedback for their professional development and growth.

Cost implications; technology is disrupting; entrenched organizational culture focusing on conventional chalk and talk learning; technology can interrupt classes when opened in class; availability and access to information can lead to amplified devious and plagiarism [17] holds the analysis that transformation, might not be simply accepted-there will be some degree of conflict Challenges around the those who have access to this technology an those who don't (digital divide) ;contradictory levels of computer literacy levels; less involved due to slow down of teacher-student and student – student contact in the learning experience continue to persist. Barriers of technology include lack of motivation due to poor societal skills, deprived computer skills and deficiency in, of availability of access; a lack of adequate time and class time and a lack of motivation and social awareness and university culture [18] 1 supposed that the major barriers of education technology include a lack of self-confidence, competency and a lack of access to resources.

Misalignment among the teachers and administrators creates difficulty for faculty [19] There is a clear association between the degree to which teachers experience with these barriers and their decision to use technology for teaching [20] In a path replica exploring the technology used among 379 teachers, [21] originate that professional development, technological and administrative support, and teacher beliefs played an significant role in whether teachers are equipped to use laptops in the classes and, in turn, whether they actually did.

Teachers also details positive attitudes and experiences with the general barriers to technology usage. Researchers have found that teachers successfully and efficiently resolve technology issues during their instruction with limited further support [22] reveal positive beliefs about using technology for teaching and have a clear visualization for using technology in their teaching [23]

The common barriers to the effective usage of technology are clearly identified and well established in the existing literature [24].In spite of this knowledge, teachers carry on to report that they lack the time, resources, and training to use classroom technology for teaching-learning purposes. This has lead researchers to examine positioned professional development as a substitute to stand-alone training for technology integration. Sited professional development has tremendous prospective to support long-term changes in teachers' aptitude towards implementation of teaching practices with technology in the class by provided that individualized training and support in the context of the real classroom[25] .

Unluckily, existing researches of sited professional development go through from a number of procedural issues. To begin, those studies are deeply criticized for their reliance on the self-reports of teachers, which are prone to exaggerating teachers' tangible practices with technology [26] In adding, many studies assess the gains attained at the conclusion of a professional development effort rather than investigating teacher modifications in attitudes and practices over time . Furthermore, only some researches investigates the impact of precise situated professional development activities on teachers'

perceptions regarding barriers [27] (or real practices with technology [28]Particular the rising occurrence of technology in today's classrooms, there is a current and pressing need for research on placed professional development in educational settings that improves on these known issues and advancements for our understanding of the connection between those activities, teachers' perceptions of the barriers, and ultimately teachers' instructional practices with technology.

OBJECTIVES OF THE STUDY

The purpose of this study was to inspect the common barriers to the effective technological usage under a sustained professional development in the context of University level teaching programme. Surveys was conducted to examine changes in teachers' perceptions of the barriers over time, and observations were triangulated with teacher self-reports to improve the validity of the results and support the conclusions drawn from them [29].

RESEARCH QUESTIONS/HYPOTHESES

The research questions guiding this study were

1. How do teachers perceive the common barriers to technology integration after engaging in a program of situated professional development?
2. What were the factors that faculty believes are important either in facilitating adoption or in creating barriers that work against adoption?
3. What were teachers' instructional practices relate to their perceptions of the barriers?

METHODOLOGY

The researcher formed a survey to examine teacher perceptions of the common barriers to technology integration with the teaching -learning process. Survey items were rated using a standard five-point Likert-type scale The items that higher scores represented the presence of conditions that facilitated technology integration, whereas lower scores represented the presence of conditions that made technology integration more challenging for teachers.

The focus of the research is on the finding from the Barriers segment only. This section was comprised of 20 items. The items employed a Likert scale (1- Strongly Disagree- not a barrier, 2- Agree, 3- Undecided, 4- Agree, 5- Strongly Agree- a major barrier) to indicate the degree to which faculty perceived an item to be a barrier. The data was analyzed and interpreted by using mean, standard deviation, Variance percentage and dichotomous percentage to indicate the standardized difference through the use of SPSS .This indicates a strong level of internal consistency. Past research [30] guided the creation of the list of barriers. It was felt that an adapted list was required because the commonly reported barrier of poor access to technology was not a concern in this technology-rich environment.

POPULATION

The population in the survey (were based heavily on [31] Delphi study where consisted teachers, administrators, researchers, identified key practices and issues associated with effective technology integration in the universities. Survey items were written such that teachers could report on the extent to which they enacted those practices or encountered those issues. For example, Clark suggested that teachers need time to plan for technology and need access to technology that supports teaching and learning.

SAMPLE

The sample of the study was consisted 100 faculty members randomly selected from various public and private sector universities in Islamabad.

INSTRUMENT

Close ended questionnaire consisted 20 items divided into sub categories employed a 5 point Likert scale (1- Strongly Disagree- not a barrier, 2- Agree, 3- Undecided, 4- Agree, 5- Strongly Agree-) used to collect the data through survey.

DATA COLLECTION PROCEDURE

A four-part, web-based questionnaire was used to collect information from 100 faculty members randomly selected from various universities in Islamabad .Multiple invitations to participate were distributed by the researcher via email or by hand. Complete data was collected from 69 faculty members out of the possible 100. Of these, 52 completed the web-based version while 17 participants provided a paper version because of technical problems encountered during data submission.

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DATA ANALYSIS

Table 1. Data Analysis

Item	Mean	SD	Dich	Dich%
Faculty unsure as to how to effectively integrate technology.	4.04	.812	58	84.1%
The current reward structure does not adequately recognize those utilizing technology.	3.88	.993	45	65.2%**
There are no program standards as to what is expected for teaching with technology.	3.84	.993	47	68.1%*
There is a lack of sufficient technology training.	3.67	1.159	47	68.1%*
There is a lack of technical support regarding the technology.	3.61	1.191	44	63.8%
Faculty does not have sufficient time to integrate technology.	3.61	1.297	42	60.1%
There is a lack of support from administration.	3.52	1.119	39	56.5%
There are inadequate financial support technology-based activities.	3.39	1.166	33	47.8% **
Faculty lack basic technology skills.	3.36	1.029	36	52.2*
Technology training is offered at inconvenient times.	3.35	1.122	33	47.8
Technology training is irrelevant to teacher needs.	3.26	1.171	31	44.9
The curriculum does not allow enough time to integrate technology.	3.09	1.257	30	43.5
Faculty is not interested in integrating technology.	2.90	1.002	24	34.8
Technology is unreliable.	2.81	.974	19	27.5*
Classroom management is more difficult when using technology.	2.54	1.119	18	26.1
Software is not adaptable for meeting student needs.	2.41	.828	7	10.1**
Technology does not fit well for the course I teach.	2.30	1.142	13	18.8*
There is a scarcity of technology for faculty	1.97	.891	6	8.7
There is a scarcity of technology for the students	1.88	.883	5	7.2

*The dichotomous rank is higher than the mean rank
** The dichotomous rank is lower than the mean rank

The present study originate that the most highly recognized barriers were faculty's knowledge as to how to effectively use the technology and the limitations of the current incentive configuration. As would be expected in a laptop environment, the least notorious statements were "there is a scarcity of technology for faculty" and "there is a scarcity of technology for the students." The three additional most highly rated barriers were lack of program standards, lack of technology training, and lack of technical support.

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Amusingly, the barriers rated at the extremes, either as a major or inconsequential barrier, also recorded the minimum standard deviation. Only 7/20 barriers had a standard deviation of less than one. Of these, none were ranked from major to inconsequential barrier in positions 4 through 14. This means that the contradictory ends of the scale had the least amount of variance and indicates a higher level of agreement for these items. The most neutrally ranked barriers also show the highest standard deviations; hence, these results indicate that additional analysis is required. The dichotomous score for each variable has also been included. The dichotomous score were calculating by assigning 1 point for each a Strongly Agree or an Agree and no value for the other options. Therefore, the utmost score that may possibly be achieved on this scale was 69. The scale is useful in identifying the number of times a barrier was actually identified as being a barrier.

As would be expected, the dichotomous scores showed general agreement with the mean rank. The Spearman correlation coefficient, designed to analyze ranked variables, measured .885 which indicates a very strong correlation. Only eight items were recognized as barriers by more than half of the respondents.

KEY BARRIERS FACTOR ANALYSIS

Table 2: Key Barriers Factor Analysis

Key Barriers	Mean	Standard .Dav	Variance Percentage	Factor Loading
Reliability of Technology	3.74	0.64	13.62	.826
Accessibility of Technology	3.57	0.61	13.01	.801
Believes that technology enhance the learning	3.36	0.81	12.31	.712
Institutional support to use technology	3.07	0.88	12.77	.665
Difficulty in using technology	2.98	0.97	11.73	.804
Motivation to use technology	2.34	0.98	13.54	.448

The lowest value of standard deviation is 0.61 which mean 3.57 and variance percentage is 13.01 which show that there is a weak relationship among them. The factor analysis revealed six separate components which is related to nearly 70% of all variation. A further analysis of the components was done which involved identifying the mean of each of the relationships from the Likert scale measure. This same analysis was done using the total dichotomous score. The factor analysis was done in order to study how the barriers might be identified with each other. An additional analysis of the items was done which included identifying the mean of every of the associations from the Likert scale measure.

RESULTS/MAJOR FINDINGS

The current study originate that the most highly identified barriers were faculty's knowledge as to how to efficiently integrate technology and the shortcomings of the present motivational incentive structure. As would be probable in a laptop setting, the least identified statements were "there is a scarcity of technology for faculty" and "there is a scarcity of technology for the students." The three other most highly rated barriers were lack of program standards;

1. Teachers are insecure as to how to effectively assimilate the technology.
2. The present incentive structure does not adequately identify those operating technology
3. There are no program standards as to what
4. Faculty do not have appropriate time to use the technology
5. There is a lack of support from administration
6. Faculty absence basic technology expertise.
7. It appears that most faculties believe that the software and hardware is adequate. The faintness of the package is lack of training; support, time, and professional development that would help foster technology integration.

DISCUSSION ON MAJOR FINDINGS

As was probable, findings of the perceptions of barriers

to technology integration both established and contradicted prior work. It is possibly within this construct that the pressure of the technology-rich environment is most concentrated. This concentration is most evident when evaluating the overall rank of barriers. The following section will demonstrate the ways in which the current findings both assert and contest prior research.

In the current study, shortage of innovation in technological use for either workforce or understudies was the minimum referred to boundary. The obstruction most alluded to was the conviction that teachers are uncertain regarding how to incorporate innovation. These discoveries were bolstered by both the mean scores and the dichotomous scores. It obviously gives the idea that the technological innovation rich environment impacts the view of hindrances, particularly those that relate to the availability of innovation.

These findings were additional supported through the factor analysis and consequent component ranks. There was a durable consensus between the teachers as to which barriers were of consequence and which were of modest consequence. This is a prevailing outcome because this information can be used to design and create suitable interventions. It is easier to target interventions if an agreement exists.

At times, the findings of this research vary from both the [32] research probably because of the technology-rich environment of the University. At other times, there was accord. Both of those studies found that a lack of time to integrate technology and the complexity in scheduling enough computer time for classes were the two leading barriers. As was avowed, these were not the most cited barriers in the present research. Concurrence between this study and the Jacobsen and Beaudin projects emerges when looking at the general theme of support. This includes such concepts as technological sustain, organizational support, and pedagogical support. Faculty or teachers in all of the studies did not feel as they were being provided with enough support to become valuable technology integrators. The teachers had no one to go to for basic software backing or professional maturity. Several training that was being accessible was done in a random manner and relied upon volunteers from faculty and staff. It is very obvious as to why faculty would feel that there is a lack of support. To review the findings of this section, the faculty feels that there is more than enough technology existing to them. Though, they do not believe that they are being supported, guided or pleased in their effort to efficiently and effectively use the technology into their teaching.

CONCLUSIONS

The study identified various important barriers to the effective use of technology specially in teaching, most universities regardless of their currant usage level of technology, will have faculty members failing into all categories along the adoption curve. The results of our study were quit consistent across faculty at different level of technological usage.

The general categories of the barriers towards the effective usage include reliability, lack of time, motivation, inadequate trainings, uncertainty of flexible environment, organizational and cultural differences among campuses will make implementing our recommendations quite different at each university.

RECOMMENDATIONS

To support faculty in learning new technologies and to overcome the barriers in the effective use of technology in multidimensional teaching, contemplate the following suggestions,

1. Have faculty with diverse levels of proficiency test new classroom technology setups before executing them in other classrooms. Such testing can guarantee that the systems are laidback for faculty to learn. In many universities, some faculty like to testing with the way they teach. These faculty must have chances to reveal problems and get them corrected before the technologies move into systematic use.
2. Classrooms should be as similar as possible — one system is easier to learn than many.
3. Given that classrooms need to fluctuate occasionally, they should comprise simple, well-designed and tested credentials about the technologies in the class room, how they work, and, if suitable, any variances from the basic classroom setup on campus. This information should be available to faculty for reference (Web site or paper) outside of the classroom so that they can prepare properly.
4. Offer training programs. Chizmar and Williams also recommend launching special venues in which faculty can come together and discuss their experiences with usage and implementation.

REFERENCES

[1] Anderson, T., Varnhagen, S., & Campbell, K. (1998). Faculty adoption of teaching and learning technologies: Contrasting earlier adopters and

mainstream faculty. The Canadian Journal of Higher Education, 2(3), 71-98.

[2] Bariso, E. U. (2003). The computer revolution: Friend or foe to FE college staff. British Journal of Educational Technology, 34(1), 85-88.

[3] Beaudin, L. C. (2002). Bernard Lonergan's notions of authenticity and technology integration. Unpublished doctoral dissertation, University of Calgary, Calgary, Alberta, Canada

[4] Becker, H. J. (2000). Internet use by teachers. In Technology and learning (80-111). San Francisco: Jossey-Bass

[5] Beggs, T. A. (2000). Influences and barriers to the adoption of instructional technology.

[6] In Proceedings of the Mid-South Instructional Technology Conference. (ERIC Document Reproduction Service No. ED446764)

[7] Blount, J., Blunt, S., Bock, R., Bowen, M., Britt, M., Chandler, A., et al. (2002). Guidebook for developing an effective instructional technology plan: Version 3.5. Retrieved July 9, 2003

[8] Boe, T. (1989). The next step for educators and the technology industry: Investing in teachers. Educational Technology, 29(3), 39-44.

[9] Caverly, D., Peterson, C., & Mandeville, T. (1997). A generational model for professional development: Training teachers to use computers. Educational Leadership, 55(3), 56-59. Retrieved September 3, 2002, from Expanded Academic ASAP database.

[10] Cuban, L. (2001). Oversold and underused: Computers in the classroom. London: Harvard University Press

[11] Cuban, L., Kirkpatrick, H., & Peck, C. (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. American Educational Research Journal, 38(4), 813-834.

[12] Ertmer, P. A. (1999). Addressing first- and second-order barriers to change Strategies for technology integration. Educational Technology Research and Development, 47(4). 47-61.Z

[13] Ertmer, P. A., Addison, P., Lane, M., Ross, E., & Woods, D. (1999). Examining teachers beliefs about the role of technology in the elementary

[14] Jacobsen,D.M. (1998). Characteristics and adoption patterns of faculty who integrate education. Unpublished doctoral dissertation, University of Calgary, Alberta, Canada. Retrieved January 6, 2004

[15] Kontos,G. (2001). The laptop university: A faculty perspective, Educational Technology Review 9(1), Oct 24

[16] Maddux, C. D. (1998). Barriers to the successful use of information technology in education. Computers in the Schools, 14(3/4), 5-11.

[17] Newhouse, P. (1999). Examining how teachers adjust to the availability of portable computers. Australian Journal of Educational Technology, 15(2), 148-166.

[18] November, A., Staudt, C., Costello, M., &Huske, L. (1998). Critical issue: Developing aschool or district technology plan. Retrieved July 8, 2003

[19] Olsen, F. (2001). Duke U. decides against requiring freshmen to own laptops. The Chronicleof Higher Education: Information Technology. Retrieved April 12, 2004

[20] Scheffler, F. L., & Logan, J. P. (1999). Computer technology in schools: What teachers should know and be able to do. Journal of Research on Computing in Education 31(3), 305-326.

[21] Snoeyink, R., &Ertmer, P. A. (2002). Thrust into technology: how veteran teachers respond. Journal of Educational Technology Systems, 30(1), 85-111.

[22] Vaughan, W. (2002). Professional development and the adoption and implementation of new innovations: Do teacher concerns matter? International Electronic Journal For Leadership in Learning, 6(5), Retrieved October 22.